COMP90007 Assignment 1

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Q1:

1. The fraction of each packet used by protocol headers = Total number of header bytes / Total packet size.
2. Total number of header bytes = 20 + 20 + 20 + 100 + 30 + 20 + 40 + 60 + 80 + 150 = 540 bytes.
3. Total packet size = Message payload + Total number of header bytes = M + 540.
   Ans = 540 / (M + 540).

Q2:

1. Time takes to transmit = Image size / Modem speed.
2. Image size = 4080 * 2040 * 3 * 8 bits = 199,756,800 bits.
   Over 64-kbps modem: 199,756,800 / (64 * 10^3) = 3121.2 secs.
   Over 1-Mbps modem: 199,756,800 / (10^6) = 199.7568 secs.

Q3:

1. Add r = degree of polynomial = 4 zeros bits to the low-order end of input data, divide the bit string corresponding to the polynomial, and subtract the remainder; using modulo 2 division & subtraction.

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            ___________
10011 | 11011010000
        10011
        010000
         10011
         00011100
            10011
            011110
             10011
             011010
              10011
              01001        →    Data sent: 11011011001
```

Q4:

The disadvantages of the TCP/IP model in comparison to the OSI model:

- It does not have explicit distinctions between the concepts of service, interface, and protocol.
- It does not support connection-oriented communication in the network layer.
- It does not guarantee delivery of packets in the transport layer.
- It does not have a separate Presentation layer or Session layer.
- It can be difficult to replace protocols.